

Trends in polybrominated diphenyl ethers in eggs of aquatic and marine birds from British Columbia, Canada, 1979-2002

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Trends in polybrominated diphenyl ether (PBDE) flame retardants were determined in eggs of birds from British Columbia. Temporal trends in the Fraser River estuary, 1983-2002, were examined in great blue herons, and from the Strait of Georgia, 1979-2002, in double-crested cormorants. Results were compared with ospreys from the lower Fraser River and Columbia River (Castlegar), and Leach's storm-petrels from the Queen Charlotte Islands. PBDEs increased exponentially (doubling time 5.7 years) in herons and cormorants. Mean PBDE, 455 µg/kg w.w., were highest in herons from the Fraser estuary, 2002. Concentrations in cormorants and ospreys from sites of varying urban influence were about half that value. Leach's storm petrels had trace amounts of PBDE, 3.38 µg/kg. Over this period of increasing PBDEs, PCBs and DDE were stable or declining. The PBDE pattern was reasonably consistent, with BDEs 47 > 100 > 99 > 153 > 154 > 28 > 183. We interpreted the main source is Penta-PBDE formulation and Octa formulation secondary. Higher resolution analysis of some eggs revealed presence of Deca formulations. At some locations, exposure of some fish-eating birds to Penta-BDEs is close to toxicity values from rodent studies, based on calculations of dietary intake from fish data.